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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,865	08/14/2001	Eric Henderson	7211.01	8708
23510	7590	07/08/2004	EXAMINER	
MICHAEL BEST & FRIEDRICH, LLP ONE SOUTH PINCKNEY STREET P O BOX 1806 MADISON, WI 53701			FORMAN, BETTY J	
			ART UNIT	PAPER NUMBER
			1634	

DATE MAILED: 07/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/929,865	HENDERSON ET AL.	
	Examiner	Art Unit	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 17-19 and 21-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 17-19 and 21-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4/04</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 24 March 2004 has been entered.

Status of the Claims

2. This action is in response to papers filed 24 March 2004 in which the specification and claim 1 were amended, claims 20 was canceled and claims 21-34 were added. All of the amendments have been thoroughly reviewed and entered.

The previous rejections in the Office Action dated 24 December 2003 withdrawn in view of the amendments and Abandonment of Application 10/128,727. Applicant's arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections and new grounds for rejection. New grounds for rejection are discussed.

Claims 1-13, 17-19, 21-34 are under prosecution.

Information Disclosure Statement

3. Applicant has submitted two Information Disclosure Statements dated 26 April 1004. One consists of a single page 1449 listing three non-patent literature references. The

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references have been considered and a copy of the initialed and signed 1449 is included with this action. The second IDS is a duplicate of the IDS submitted 25 September 2003. These references were previously considered and a copy of the initialed and signed 1449 was mailed along with the Office Action of 24 December 2003.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 is indefinite for the recitation "x, y, z controller.....along the z axis" because the recitation lacks proper antecedent basis in Claim 21 which does not recite a z controller or z axis.

Claim 26 is indefinite for the recitation "x, y, z controller" because the recitation lacks proper antecedent basis in Claim 21 which does not recite a z controller.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Aksyuk et al (U.S. Patent No. 5,963,367, issued 5 October 1999).

Regarding Claim 17, Aksyuk et al disclose an apparatus comprising a z controller (Column 4, lines 1-9 and #48), a deposition probe comprising a tip (Column 7, lines 57-67) operably attached to the z controller, an x, y controller operably attached to the z controller and a deposition substrate (#12) operably affixed to the x, y controller wherein the substrate is movable between a first and second position under the tip (Column 2, lines 50-67, Column 7, lines 11-67 and Claims 1-17).

8. Claims 1-2, 7-8, 10, 12, 17, 21-22, 27-28, 30 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Overbeck et al (U.S. Patent Application Publication No. 2002/0083998, filed 3 January 2002).

Regarding Claim 1, Overbeck et al disclose an apparatus comprising a base, a z controller operably connected to the base, a deposition probe removably and operably connected to the z controller (PA) and positionable along the z axis, an x, y translation stage connected to the base and comprising a deposition substrate (R) attached thereto wherein movement of the x, y controller moves the deposition substrate between a first and second position under the deposition probe, and an x, y translation stage operably connected to the

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base and comprising a loading substrate (MW) attached thereto wherein movement of the x, y controller moves the loading substrate between a first and second position under the deposition probe (Fig. 11 and ¶ 192-198, especially ¶ 197-198).

Regarding Claim 2, Overbeck et al disclose the apparatus further comprising a control computer (¶ 192).

Regarding Claim 7, Overbeck et al disclose the apparatus wherein the loading substrate comprises deposition materials (¶ 192).

Regarding Claim 8, Overbeck et al disclose the apparatus further comprising an optical microscope operably attached (¶ 263).

Regarding Claim 10, Overbeck et al disclose the apparatus wherein the deposition probe includes a tip (¶ 107).

Regarding Claim 12, Overbeck et al disclose the apparatus wherein the computer control further includes stepper motor control (¶ 208).

Regarding Claim 17, Overbeck et al disclose an apparatus comprising a z controller, a deposition probe operably connected to the z controller (PA) wherein the deposition probe includes a tip (¶ 107), an x, y controller operably attached to the z controller and a deposition substrate (R) operably attached to the x, y controller wherein the substrate is movable between a first and second position under the tip (Fig. 11 and ¶ 192-198, especially ¶ 197-198).

Regarding Claim 21, Overbeck et al disclose an apparatus comprising a base, a deposition probe (PA) removably and operably connected to the base, an x, y translation stage connected to the base and comprising a loading substrate (MW) attached thereto wherein movement of the x, y controller moves the loading substrate between a first and second position under the deposition probe and an x, y controller operably connected to the base and comprising a deposition substrate (R) attached thereto wherein movement of the x, y controller moves the deposition substrate between a first and second position under the deposition probe, (Fig. 11 and ¶ 192-198, especially ¶ 197-198).

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Regarding Claim 22, Overbeck et al disclose the apparatus further comprising a control computer (§ 192).

Regarding Claim 27, Overbeck et al disclose the apparatus wherein the loading substrate comprises deposition materials (§ 192).

Regarding Claim 28, Overbeck et al disclose the apparatus further comprising an optical microscope operably attached (§ 263).

Regarding Claim 30, Overbeck et al disclose the apparatus wherein the deposition probe includes a tip (§ 107).

Regarding Claim 32, Overbeck et al disclose the apparatus wherein the computer control further includes stepper motor control (§ 208).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 18 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk et al (U.S. Patent No. 5,963,367, issued 5 October 1999) in view of Hong et al (Science, 9 June 2000, 288: 1808-1811)

Regarding Claim 18, Aksyuk et al disclose an apparatus comprising a z controller (Column 4, lines 1-9 and #48), a deposition probe comprising a tip (Column 7, lines 57-67) operably attached to the z controller, an x, y controller operably attached to the z controller and

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a deposition substrate (#12) operably affixed to the x, y controller wherein the substrate is movable between a first and second position under the tip (Column 2, lines 50-67, Column 7, lines 11-67 and Claims 1-17).

Aksyuk et al further teach the apparatus comprises an AFM tip affixed to the z controller (Column 7, lines 62-67) but do not teach computer control, force feedback monitor or humidity controller affixed to the z controller. However, Hong et al teach a similar apparatus comprising x, y, z translation stage, an AFM tip operably affixed to the z stage. Hong et al further teach computer control, force feedback monitor or humidity controller affixed to the z controller (page 1808, left column –first paragraph of page 1809) wherein the components provide the control necessary to permit multiple-tip deposition (Abstract). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the apparatus of Aksyuk et al with the computer control, force feedback monitor or humidity controller affixed to the z controller of Hong et al (page 1808, left column –first paragraph of page 1809) for the expected benefit of providing the control necessary to permit multiple-tip deposition (Abstract).

11. Claim 19 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk et al (U.S. Patent No. 5,963,367, issued 5 October 1999) in view of Hong et al (Science, 9 June 2000, 288: 1808-1811) as applied to Claim 18 above and further in view of Mirkin et al (U.S. Patent No. 6,635,311, filed 5 January 2000).

Regarding Claim 19, Aksyuk et al and Hong et al teach the apparatus of Claim 18 comprising AFM tips as detailed directly above. Hong et al further teach tip cleaning (page 1809, lines 9-21) but are silent regarding cleaning components. However, Mirkin et al teach

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the similar AFM apparatus wherein the preferred cleaning (i.e. ozone cleaning) increases hydrophobicity of the AFM tip (Column 5, lines 40-44). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the teaching of ozone cleaning of Mirkin et al to the apparatus of Aksyuk et al and Hong et al by adding an ozone source to their apparatus. One of ordinary skill in the art would have been motivated to do so based on the preferred method for increasing hydrophobicity as taught by Mirkin et al (Column 5, lines 40-44).

12. Claims 3-6, 9, 11, 13, 18-19, 23-26, 29, 31 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overbeck et al (U.S. Patent Application Publication No. 2002/0083998, filed 3 January 2002) in view of Mirkin et al (U.S. Patent No. 6,635,311, filed 5 January 2000) and Hong et al (Science, 9 June 2000, 288: 1808-1811).

Regarding Claims 3-6, 9, 11, 13, 18-19, 23-26, 29, 31 and 33-34, Overbeck et al disclose the apparatus of Claims 1-2 as described above comprising a base, a z controller operably connected to the base, a deposition probe removably and operably connected to the z controller (PA) and positionable along the z axis, an x, y translation stage connected to the base and comprising a deposition substrate (R) attached thereto wherein movement of the x, y controller moves the deposition substrate between a first and second position under the deposition probe, and an x, y translation stage operably connected to the base and comprising a loading substrate (MW) attached thereto wherein movement of the x, y controller moves the loading substrate between a first and second position under the deposition probe (Fig. 11 and ¶ 192-198, especially ¶ 197-198).

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Overbeck et al do not teach the apparatus further comprises a humidity controller or force feedback monitor wherein the x, y and/or z controller has nanometer resolution. However, these elements were well known in the art at the time the claimed invention was made as taught by Mirkin et al and Hong et al.

Mirkin et al and Hong et al are co-inventors and co-authors of the cited references. Both references describe very similar nanoplotters and differ only in the details discussed in each reference.

Mirkin et al teach a nanoplotter device comprising a deposition pin (AFM), a series of wells comprising patterning compounds and rinsing solutions, and an adjacent substrate on which the patterning compounds are deposited (e.g. Column 11, lines 26-41) wherein the humidity is "held" constant (e.g. Column 3, lines 31-35) providing 10nm resolution (Column 22, lines 52-60) and further comprising a dry gas source and gas flow monitor (Column 19, lines 16-34) and ozone for cleaning (Column 5, lines 40-44). Mirkin et al teach that their device overcomes the known probes caused by water condensation (i.e. high humidity) and provides improved resolution (Column 2, line 12-37).

Hong et al teach the similar device comprising and x, y, z translation stage, a deposition pin (AFM), humidity controller, force feedback monitor and 5 nm spatial resolution (page 1808, left column-page 1809, first paragraph and Abstract).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the apparatus of Overbeck et al by adding the humidity controller, force feedback monitor and AFM pin having nanometer resolution in the x, y and z axis as taught by Mirkin et al and Hong et al. Mirkin et al provides the motivation to do so wherein they teach their "dip pin nanotechnology" (DPN) provides a powerful tool for transporting molecules to substrates at "resolutions comparable to those achieved with much more expensive and sophisticated" devices (Column 12, lines 47-57). Hence, one of ordinary skill in the art would have been motivated to apply the DPN components to the apparatus of

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Overbeck et al for the expected benefit of obtaining high-resolution deposition with reduced cost and complexity as taught by Mirkin et al (Column 12, lines 47-57).

Conclusion

13. No claim is allowed.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

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BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
July 2, 2004